Weiss Lake/Coosa River PCB TMDLs

SITE: GE ROME
BREAK: 20.1 V.121
OTHER:

Joint Meeting
United States Environmental Protection Agency/Georgia EPD / General Electric
January 22, 2004

Weiss Lake/Coosa River PCB TMDL Issues

- Objective: Develop appropriate approach to PCB TMDLs for Georgia and Alabama
- Defining the problem:
  - Portions of the Coosa River basin in both states and Weiss Lake are determined to be impaired solely due to fish consumption advisories
  - Legacy contamination
  - Potential continuing source: uncontrolled surface runoff
- TMDL Goal: Removal of fish consumption advisories

GE TMDL Proposal

Eliminate fish advisories by -

- Continued natural recovery
- Control of potential sources
  - GE Rome: PCB Source Controls
    - Storm water capture and treatment/on-site controls
    - Onsite and offsite groundwater treatment systems
  - GE Rome: PCB Source Remediation
    - Completed remedial actions
    - Future remedial actions under EPD RCRA permit

Fish Tissue Trends

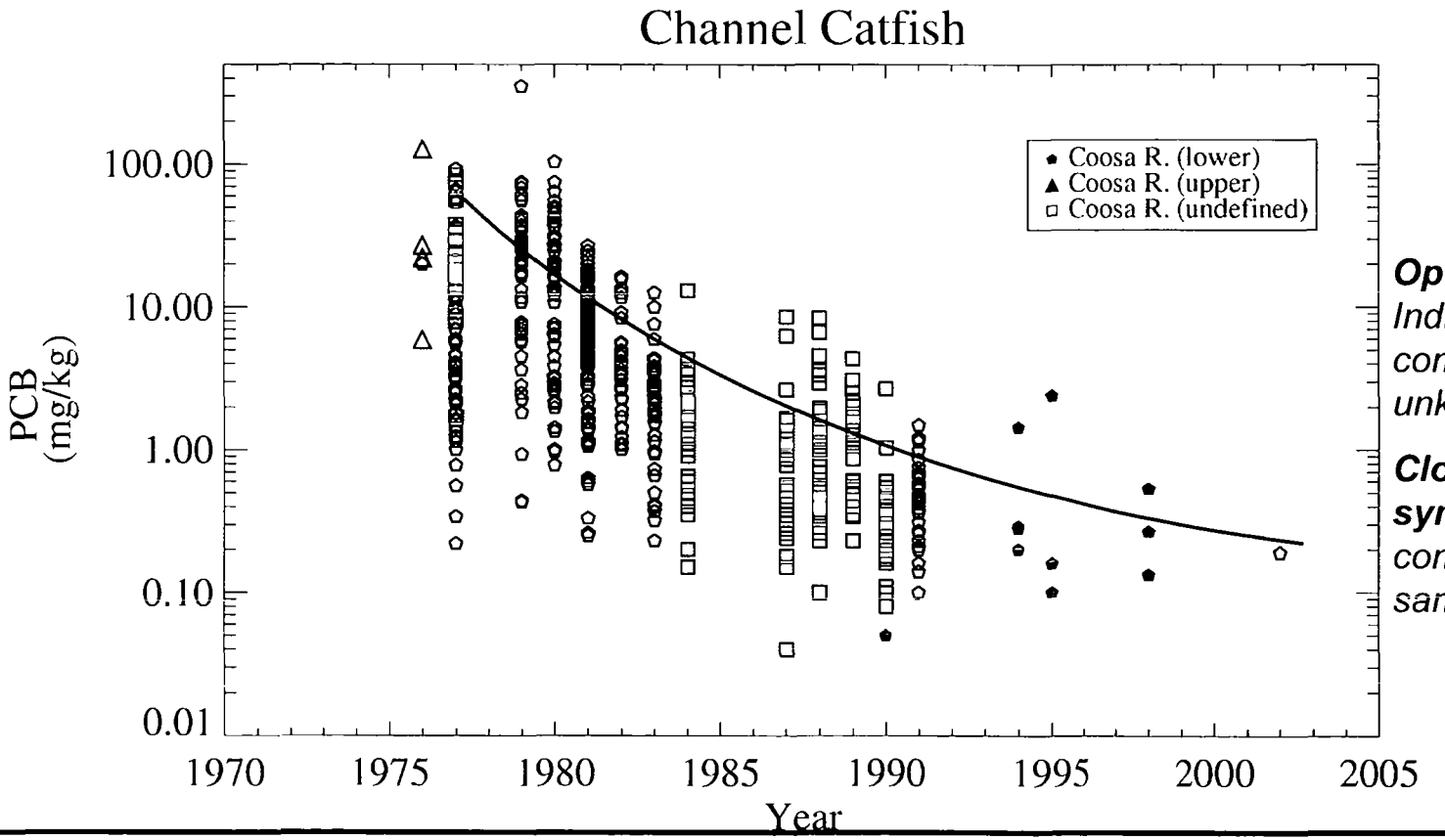
- Coosa system has demonstrated long-term natural recovery; fish tissue concentrations have decreased more than 90% since PCB usage stopped in the 1970s
- Recent trends in fish tissue data appear consistent with long-term recovery pattern; ability to assess recent trends affected by data limitations
- Temporary increases in early 1990s may be due to unusually high volumes of surface runoff; system recovery has resumed and continues
- Weiss Lake exhibits similar fish tissue data and natural recovery capability; these are segments of the same system

Natural Recovery

- Data demonstrate long-term recovery of system
  - 20 to 40% per year following cessation of PCB use
  - All fish species exhibit long-term decline in fish tissue concentrations
  - Sediment data confirm recovery
- Recent fish trends more difficult to evaluate due to
  - Limited number of fish samples – sampling scaled back due to progress made
  - Variation in fish size within and between years
  - Lack of lipid data
- Prospects for continued recovery
  - Ongoing and future planned measures to control/remediate potential surface sources will further minimize potential for loadings to the river

Natural recovery has occurred and is continuing.

Example of Observed Natural Recovery



Open symbols: *Individual fish or composite # unknown*

Closed symbols: *composite samples.*

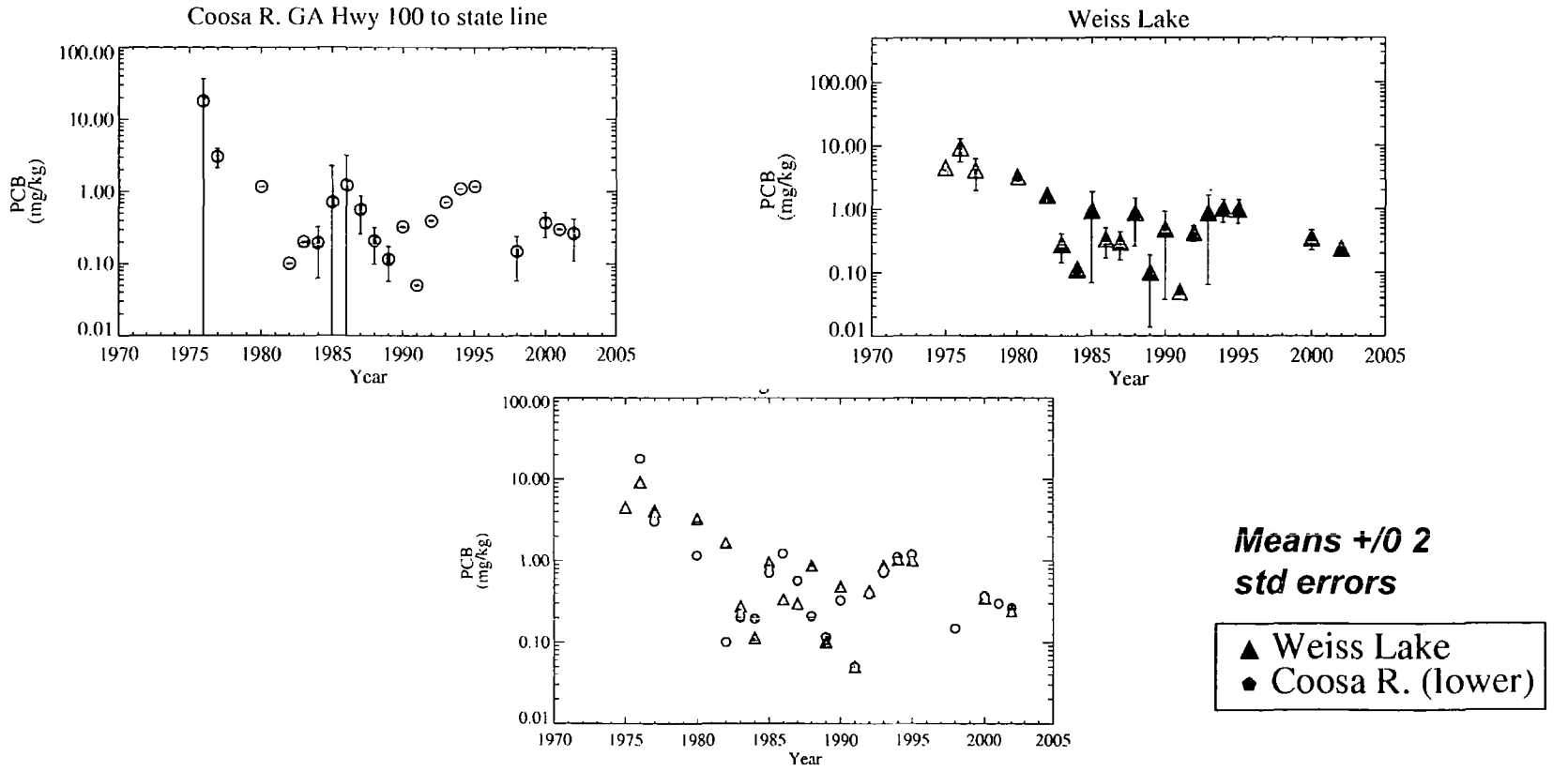
PCB levels in fish exhibit natural recovery. Sampling has been reduced in recent years as a result. Similar pattern observed in other species.

Weiss Lake TMDL

- PCB levels in fish from Weiss Lake appear to be controlled by the same factors that control levels upstream in Georgia
- PCBs in Weiss Lake show natural recovery similar to the Coosa River upstream for both fish and sediment
- Lower Coosa and Weiss Lake are segments of same system
- The Georgia fish advisory levels are more restrictive than Alabama's – 0.1 ppm v. 1.0 ppm
- Controls implemented to address fish advisories in Georgia will also address fish advisories in Alabama

Georgia fish tissue recovery will result in removal of Alabama advisories.

PCBs in Largemouth Bass from Weiss Lake



Weiss Lake fish tracked levels in the lower Coosa River in Georgia. Natural recovery demonstrated in Weiss Lake. Similar pattern observed in other species.

PCB Source Remediation

- Completed remedial actions
  - Landfill A – cap, HVE and leachate controls 2000 to date
  - Tolbert Park – removed shallow soils along Little Dry Creek
  - Undeveloped property – removed shallow soils along drainage pathway
  - West Central Elementary – removed shallow soils along drainage pathway
  - Creek bank soils – removed shallow soils in flood plain along Little Dry and Horseleg creeks
- Planned actions under EPD RCRA permit
  - Remove more than 70,000 tons of soil from Redmond Circle commercial corridor along historical drainage ditch
  - Remediate GE/GA Corp wetland property; install new surface water controls to mitigate migration
  - Remediate onsite SWMUs/AOCs

Remediation under RCRA permit will require that appropriate remediation measures are taken to protect human health and the environment.

PCB Source Controls

- Storm Water Capture and Treatment/Onsite Controls
  - GE has identified significant impacted areas onsite; erosion controls have been implemented through gravel cover and paving
  - Source controls have reduced solids loading and decreased PCB concentrations in storm water runoff before treatment
  - System designed to capture and contain 8 million gallons of storm water from manufacturing area
  - Design treatment rate - 800 gpm (typical 700 to 750 gpm); 70 million gallons treated in 2002
  - Treatment by solids removal and carbon adsorption
  - Treated effluent discharges to drainage channel leading to Horseleg Creek
  - Discharge limit 2 ppb; consistently less than 0.5 ppb detection limit
  - Office bldg./parking lot storm water meets limit without treatment; discharges to Little Dry Creek

PCB Source Controls

- Onsite groundwater treatment system
  - Hydraulic containment provided by pumping wells
  - Permit requires treatment of all groundwater above MCLs
  - Treatment system capacity – 100 gpm (typical rate 35 gpm)
  - Treats groundwater and landfill leachate
  - State-of-the-art technology: oil/water separation, air stripping (VOC removal), solids removal, and carbon adsorption
  - Discharge consistently less than 0.5 ppb detection limit
- Offsite groundwater treatment system to be constructed in 2004
  - System will provide hydraulic containment of affected groundwater
  - Permit requires treatment of all groundwater above MCLs
  - Treatment system capacity – 50 gpm
  - State of the art technology: oil/water separation, air stripping (VOC removal), solids removal and carbon adsorption

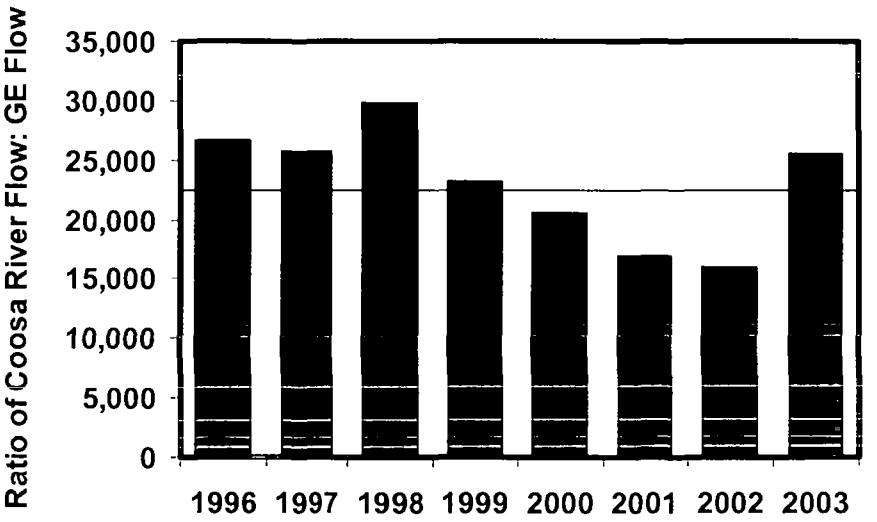
All impacted groundwater, onsite and offsite, will be captured and treated.

State-of-the-Art Treatment

- Activated carbon currently used in Rome is the most-widely used and best available technology for PCB removal
  - System is very effective in removing PCBs
- Other Applicable Technologies Evaluated
  - Biologically activated carbon; activated sludge; UV chem ox; reverse osmosis (limited by flow rate); ultra filtration (0.03 micron); chemical clarification
- Removal efficiency of activated carbon exceeds other available technologies; activated carbon is state of the art for PCB removal
- Critical issue is solids removal efficiency – significant efforts in existing system to reduce solids prior to carbon treatment – average 6 NTUs prior to carbon
- System improvements to further reduce solids may provide incremental improvement in treatment efficiency, but would require large expense for additional storage, solids handling and significant reduction in discharge rate
  - Even with system improvements, discharge will remain orders of magnitude above proposed 0.000097 ppb and 0.00017 ppb end-of-pipe limits proposed for Weiss Lake and Coosa River, respectively

Coosa River Assimilative Capacity

- Flow from the GE facility is intermittent
  - There is no flow about 70% of the time
- Flows from the GE facility occur only in association with storm events
- GE effluent is a tiny fraction of Coosa River flow
  - Dilution factors range from 16,000 to 30,000 on an annual basis
- End-of-pipe application of water quality standard not necessary or appropriate



Line indicates long-term average

GE effluent is diluted approximately 23,000-fold, on average, as it enters the Coosa River.

TMDL Goal: Removal of Fish Consumption Advisories

- Fish tissue level of 0.1 ppm necessary to remove Georgia fish advisories (Alabama advisory limit is 1 ppm)
- Ongoing natural recovery and control of potential continuing sources should achieve 0.1 ppm in fish
- Proposed approach consistent with:
  - PCB and mercury TMDLs in Georgia and elsewhere
  - Federal TMDL requirements
- Proposed approach will address both Weiss Lake and Coosa River